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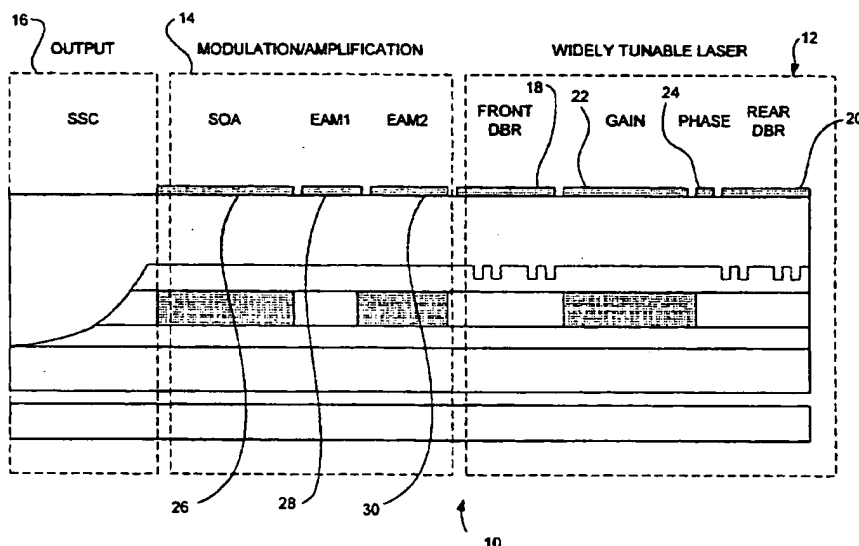
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(54) Title: METHOD OF CONVERTING AN OPTICAL WAVELENGTH WITH AN OPTO-ELECTRONIC LASER WITH INTEGRATED MODULATOR



(57) Abstract: A method of converting an optical wavelength includes providing a wavelength converter assembly with a photodetector and a laser with a common epitaxial structure. The epitaxial structure has areas of differing bandgap. An optical input having a first wavelength at the wavelength converter assembly is absorbed. A first electrical signal is generated from the photodetector in response to the optical input. The first electrical signal is conditioned to produce a conditioned first electrical signal. A second electrical signal is generated from the conditioned first electrical signal. A laser output is generated from a gain medium of the laser at a second wavelength in response to the second electrical signal.

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 LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,
 NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM,
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INTERNATIONAL SEARCH REPORT

International Application No

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A. CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	BAR-CHAIM N ET AL: "MONOLITHIC OPTOELECTRONIC INTEGRATION OF A GAALAS LASER, A FIELD EFFECT TRANSISTOR AND A PHOTODIODE" APPLIED PHYSICS LETTERS, US, AMERICAN INSTITUTE OF PHYSICS, NEW YORK, vol. 44, no. 10, 15 May 1984 (1984-05-15), pages 941-943, XP002016763 ISSN: 0003-6951 page 941, column 2, line 10 -page 942, column 2, line 2; figures 1,2 ---	1-4, 9, 19-24, 28, 32, 33
X	US 5 742 045 A (KIMMET JAMES S ET AL) 21 April 1998 (1998-04-21) the whole document --- -/--	1, 14, 15, 19-21, 32, 33

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
X	US 5 625 636 A (JEWELL JACK L ET AL) 29 April 1997 (1997-04-29) column 8, line 17 -column 9, line 44; figures 4,7 ----	1,19
X	US 5 674 778 A (LEE KWYRO ET AL) 7 October 1997 (1997-10-07) column 2, line 36 -column 5, line 7; figure 1 ----	1,19
A	KIM B -S ET AL: "DYNAMIC ANALYSIS OF WIDELY TUNABLE LASER DIODES INTEGRATED WITH SAMPLED- AND CHIRPED-GRATING DISTRIBUTED BRAGG REFLECTORS AND AN ELECTROABSORPTION MODULATOR" IEICE TRANSACTIONS ON ELECTRONICS, INSTITUTE OF ELECTRONICS INFORMATION AND COMM. ENG. TOKYO, JP, vol. E81-C, no. 8, August 1998 (1998-08), pages 1342-1349, XP000848540 ISSN: 0916-8524 -----	1,19,125
X	the whole document -----	37,67, 70,97
X	US 5 479 539 A (GOLDSMITH CHARLES L ET AL) 26 December 1995 (1995-12-26) -----	37,40, 67,70, 97,100
A	column 7, line 1 -column 8, line 34; figure 3 -----	125
X	KOCH T L ET AL: "SEMICONDUCTOR PHOTONIC INTEGRATED CIRCUITS" IEEE JOURNAL OF QUANTUM ELECTRONICS, US, IEEE INC. NEW YORK, vol. 27, no. 3, 1 March 1991 (1991-03-01), pages 641-653, XP000227520 ISSN: 0018-9197 -----	37,67,97
A	paragraph 'III.A!; figure 2 -----	125
A	US 5 525 541 A (RAO ELCHURI K ET AL) 11 June 1996 (1996-06-11) column 2, line 5 - line 10 -----	125

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/22771

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5742045 A	21-04-1998	NONE	
US 5625636 A	29-04-1997	NONE	
US 5674778 A	07-10-1997	US 5535231 A	09-07-1996
US 5479539 A	26-12-1995	JP 8172215 A	02-07-1996
US 5525541 A	11-06-1996	FR 2715770 A	04-08-1995
		EP 0666604 A	09-08-1995
		JP 7263818 A	13-10-1995

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/41775

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5960018 A	28-09-1999	US 5825796 A AU 4588597 A WO 9813879 A	20-10-1998 17-04-1998 02-04-1998
EP 0833395 A	01-04-1998	JP 10152399 A US 6046096 A	09-06-1998 04-04-2000
EP 0896406 A	10-02-1999	JP 11288886 A JP 11112096 A	19-10-1999 23-04-1999